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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,809	11/09/2005	Hiroshi Ichikawa	52433/789	8919

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EXAMINER	
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ART UNIT	PAPER NUMBER
1793	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,809	ICHIKAWA ET AL.	
	Examiner	Art Unit	
	TIMA M. MCGUTHRY-BANKS	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *26-33,35,37,38 and 41-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-33,35,37,38 and 41-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

Claims 1-25, 34, 36, 39 and 40 are canceled, Claims 26, 27, 37 and 38 are currently amended, Claims 28-33, 35, 41 and 42 are previously presented and Claim 43 is new.

Response to Amendment

Due to new grounds of rejection, the finality of the last rejection has been withdrawn.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 26-33, 35 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Myerson et al (US 5,942,198) (Myerson et al '198) in view of Myerson et al (US 5,851,490) (Myerson et al '490), Ibaraki et al (US 6,755,888 B2) and Hoffman et al (US 6,648,942 B2).

Myerson et al '198 teaches the beneficiation of furnace dust, for recovery of chemical and metal values. Regarding Claims 26 and 27, the furnace dust includes zinc, lead, and iron compounds (column 1, lines 21 and 22). A carbon product is also used (column 6, line 58). The dust may contain the following in Table 1:

TABLE I

Analysis of Flue Dust

Component	Weight Percent
zinc oxide	39.64
iron oxide	36.74
lead oxide	5.72
inert materials[1]	9.10
calcium oxide	2.80
potassium oxide	2.41
manganese oxide	1.29
tin oxide	1.13
aluminum oxide	0.38
magnesium oxide	0.33
chromium oxide	0.16
copper oxide	0.06
silver	0.05
unidentified materials[2]	0.22
TOTAL	100.00

[1]siliceous material, such as slag, with carbon granules occluded.
[2]molybdenum, antimony, indium, cadmium, germanium, bismuth, titanium, nickel and boron.

The dust is fed to a hydrometallurgical process (column 10, line 15), which inherently includes water. Solutions of pH greater than 10 or less than 3 can be used in addition to ammonium chloride (column 16, lines 12-17); other solutions include sodium hydroxide, ammonium sulfate, ammonium phosphate, potassium hydroxide, ammonia/ammonium oxalate, and ammonia/ammonium carbonate (column 7, lines 35-38). Regarding the pH, in the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists. See MPEP § 2144.05. The precipitate, which includes iron oxide, is dried (column 30, lines 58, 65 and 66), compacted and sent to a reduction furnace to produce DRI (column 31, lines 4-12).

However, Myerson et al '198 does not specifically teach the alkali /(zinc + lead) ratio or charging the dehydrated material to a rotary reduction furnace or an exhaust gas treatment

facility having at least one of a waste heat boiler an air preheater as in Claims 26 and 27 or recovering the dust as in Claim 43.

Regarding the alkali/(zinc + lead) ratio, Myerson et al '490 teaches utilizing pH control in the recovery of metal and chemical values from industrial waste streams. Table I shows a typical industrial waste stream:

TABLE I

Analysis of Fine Dust

Component	Weight Percent
zinc oxide	30.00
iron oxide	40.00
lead oxide and lead chloride	6.48
inert materials[2]	9.10
sodium oxide and sodium chloride	5.00
calcium oxide	2.80
potassium oxide and potassium chloride	3.00
manganese oxide	1.20
tin oxide	1.13
aluminum oxide	0.38
magnesium oxide	0.33
chromium oxide	0.16
copper oxide	0.05
silver	0.05
unidentified materials[2]	0.22

The ratio of $[(NaO + NaCl) + (K_2O + KCl_2)]$ to (ZnO + PbO) is within the claimed range. It would have been obvious to one of ordinary skill in the art at the time the invention was made that the flue dust in Myerson et al '198 could contain the alkali compounds of Myerson et al '490, since both Myerson et al '198 and Myerson et al '490 both teach the same endeavor of treating furnace dust from the same type of metalworking process.

Regarding the rotary hearth furnace and Claim 43, Ibaraki et al teaches a facility for reducing metal oxide. A powdery mixture having a moisture content of 100% or higher relative to the total mass of a metal oxide-containing powder and a carbon-containing powder is made into a slurry and mixed by stirring. The slurry is dehydrated and compression-molded into

articles. The articles are reduced by a rotary hearth furnace thereby to provide a metal (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made that the compacts of Myerson et al '198 could be reduced to DRI in the rotary furnace of Ibaraki et al, sinc Ibaraki et al teaches that using a rotary hearth furnace to produce reduced iron is a process of high productivity (column 1, lines 21-23).

Regarding at least one of a waste heat boiler an air preheater, Hoffman et al teaches a method and apparatus of iron-making/steel-making using a modified rotary hearth furnace (abstract). The invention can include utilizing tempered flue gas in a cogeneration scheme whereby the sensible heat is converted to steam by way of heating boiler feed water in a waste heat boiler. The generated stem could then be converted into electricity (column 7, lines 26-31). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a waste heat boiler in the process of Myerson et al '198, since the generation of electricity is known work in one field of endeavor. Using a waste heat boiler for the generation of electricity is predictable to one of ordinary skill in the art.

Regarding Claim 28, Table I of Myerson et al '490 teaches alkali metals and halogen elements within the claimed range.

Regarding Claims 29 and 32, Myerson et al '198 teaches a dust/solution ratio in Example 1 of 1:100 (column 16, line 49) and 1:10 in Examples 2 and 7, which is within the claimed range. However, Myerson et al '198 is silent with respect to the mass ratio of powder and water in the dehydrated material.

Ibaraki et al teaches dehydrating to a moisture content of 16-26% by mass before compression molding (column 5, lines 49-51). It would have been obvious to one of ordinary

skill in the art at the time the invention was made to dehydrate the compact in Myerson et al '198 to a content of 16-26% (not more than 1:0.4 is not more than 40% water content), since Ibaraki et al teaches that the steps of dehydration lead to explosive-free cracking of shaped articles and reduction is economical (column 17, lines 36-41).

Regarding Claim 30, Myerson et al '198 teaches that ammonium chloride is added at a temperature above 90 °C as shown in Table II:

TABLE II

Solubility of ZnO in 25% NH_4Cl solution

Temperature °C.	g Dissolved/100 g H_2O
90	14.6
80	13.3
70	8.4
60	5.0
50	3.7
40	2.3

A temperature of 80 °C is not substantially different for 90 °C; a *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. See MPEP § 2144.05 I.

Regarding Claim 31, Ibaraki et al teaches that reduction through calcination by a rotary hearth without drying a moisture-rich powdery raw material is desirable (column 4, lines 11-14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to obtain the claimed porosity range, since the cited prior art discloses the same operating conditions.

Regarding Claim 32, Ibaraki et al teaches the thickness or diameter of the compressed shapes is 30 mm or less (column 10, line 65). It would have been obvious to one of ordinary skill in the art at the time the invention was made that the that the compacts in Myerson et al

'198 would be within the range taught by Ibaraki et al, since Ibaraki et al teaches that the explosiveness of the shaped articles is influenced by their sizes. If the size is 30 mm or more, they explosively crack in the furnace (column 10, lines 59-63). Furthermore, an average diameter of shapes is 30 mm or less, which reads on a volume range of 3375 mm^3 or less (rectangular) and 10,598 mm^3 or less (spherical).

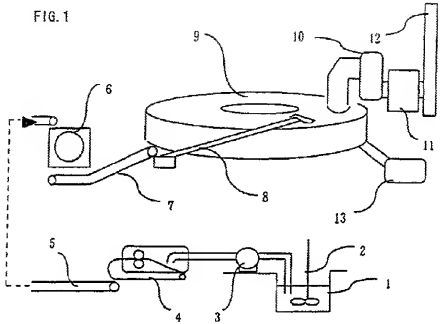
Regarding Claim 33, Ibaraki et al shows in Tables 1 and 2 the amount of oxygen and carbon in the pellets. The ratio of carbon in the reduction of iron oxide is controlled; 10 to 70% of the carbon atoms reactive with iron oxide are reacted to produce carbon dioxide (column 12, lines 27-48). A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation; therefore a *prima facie* case of obviousness exists. See MPEP § 2144.05 II B. The furnace temperature is about 1210 °C (column 15, lines 42 and 43). Additionally, A *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. See MPEP § 2144.05 I.

Regarding Claim 35, Myerson et al '198 teaches that the dust is from steelmaking.

Claims 37, 38, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ibaraki et al in view of Tateishi et al and Myerson et al '198.

Ibaraki et al teaches a reducing furnace of the rotary hearth-type and a method for reducing a metal oxide simplified in the process from dehydration to molding (abstract) as shown below in Figure 1:

FIG. 1



Ibaraki et al also teaches mixing and stirring a powdery raw material which is in a moist-rich slurry condition. The powdery raw material includes steelmaking dusts and a carbon-based powder. Water is used as the solution (column 7, lines 14-32). The powdery raw material is dehydrated by a press filter (column 8, line 4). The material is then conveyed to a compression molding machine (lines 64 and 65). Dust is collected in 12. Specifically regarding Claim 38, Ibaraki et al does not teach adding carbon-bearing material after dehydration as claimed. However, selection of any order of performing process steps is *prima facie* obvious in the absence of new of unexpected results. See MPEP § 2144.04 IV C.

Ibaraki et al does not disclose that the exhaust gas from the rotary hearth is zinc oxide, a pH adjuster and fly ash as in Claims 27 and 28 or the pH as in Claim 41.

Tateishi et al teaches an apparatus and method for producing reduced metal using a moving hearth reducing furnace (abstract). Zinc is a typical volatile component contained in the agglomerate. When the gas containing this volatile component is discharged from the exhaust

site, the volatile component is accumulated (column 6, lines 22-26). It would have been obvious to one of ordinary skill in the art at the time the invention was made that the exhaust gas in Ibaraki et al would contain zinc, since Tateishi et al teaches that zinc is a typical volatile component in the same field of endeavor.

Myerson et al '198 teaches the beneficiation of furnace dust, for recovery of chemical and metal values. The furnace dust includes zinc, lead, and iron compounds (column 1, lines 21 and 22). The dust can also include fly ash (column 8, line 26). A carbon product is also used (column 6, line 58). The dust is fed to a hydrometallurgical process (column 10, line 15), which inherently includes water. Solutions of pH greater than 10 or less than 3 can be used in addition to ammonium chloride (column 16, lines 12-17); other solutions include sodium hydroxide, ammonium sulfate, ammonium phosphate, potassium hydroxide, ammonia/ammonium oxalate, and ammonia/ammonium carbonate (column 7, lines 35-38). Regarding the pH, in the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists. See MPEP § 2144.05. The precipitate, which includes iron oxide, is dried (column 30, lines 58, 65 and 66), compacted and sent to a reduction furnace to produce DRI (column 31, lines 4-12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add ammonium chloride, sodium hydroxide, ammonium sulfate, ammonium phosphate, potassium hydroxide, ammonia/ammonium oxalate, and ammonia/ammonium carbonate to the solution in Ibaraki et al, since Myerson et al '198 teaches economically extracting zinc and other products from industrial waste streams (column 6, lines 22-24). Regarding the pH adjuster as fly ash, the presence of fly ash as taught by Myerson et al '198 would obviously perform the same function.

Regarding Claim 42, the moisture content is 16-26% (abstract).

Response to Arguments

Applicant asserts that the limitations of some claims were not addressed. Therefore, as stated above, the finality of the previous action is withdrawn. Applicant's arguments are addressed as follows, with each argument addressed separately:

The numerator in the cited formula form US '490 contains Na_2O and K_2O, which are not alkali salts, However, according to MPEP § 2141.03, a prior art reference must be considered in its entirety, i.e. as a whole, including portions that would lead away from the claimed invention.

The basic present inventive idea that prevents dust from sticking to the exhaust gas treatment apparatus by means of controlling the mole ratio is not claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding Claim 29, simultaneous conditions are not claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding the temperature greater than 80 C as taught by US '198, the examiner's position is that the temperature range of US '198 gives the same result as the instant invention. A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation; therefore a *prima facie* case of obviousness exists. See MPEP § 2144.05 II B.

Regarding Claims 31-33, the arguments are addressed above under the rejections.

Regarding Claim 43, there is no claim of both alkali and zinc. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding Claims 37, 38 and 41, the pH condition in which Zn and Pb do not dissolve is not claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Green (US 6,666,903 B1) teaches liquor compositions for the extraction of metallic elements from a metal-contaminated starting material such as dusts.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIMA M. MCGUTHRY-BANKS whose telephone number is (571)272-2744. The examiner can normally be reached on M-F 7:00 am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

/T. M. M./
Examiner, Art Unit 1793
21 November 2008